

Novel Methodology for Control and Stabilization of Spacecraft with Captured Asteroid

Completed Technology Project (2015 - 2016)



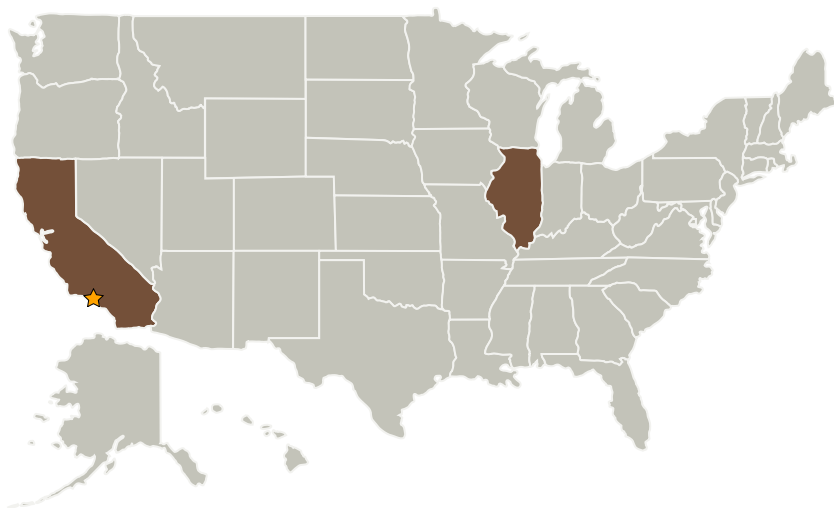
Project Introduction

Development of novel spacecraft guidance control architectures and algorithms that work in conjunction with robot manipulator control for application to ARM mission type. Emphasis will be placed on new mission scenario of controlling the spacecraft while collecting a multi-ton boulder from the surface of a large near-Earth asteroid. Computer simulation demonstration and performance analysis of control and stabilization algorithms.

Anticipated Benefits

Results of this CIF project, such as first-of-a-kind tools for stabilization and control of a spacecraft-boulder combination and synchronized robotic arm control, will have direct application to NASA and DoD (DARPA, Navy, Air Force) missions for rendezvous with tumbling spacecraft for in-orbit servicing and in-orbit construction.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
University of Illinois at Urbana-Champaign	Supporting Organization	Academia	Urbana, Illinois

Primary U.S. Work Locations

California	Illinois
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Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management

Program Director:

Michael R Lapointe

Program Manager:

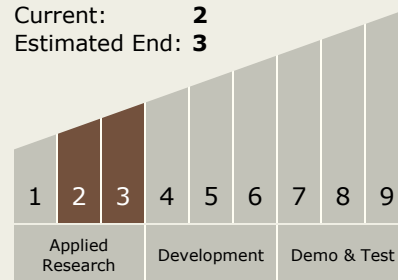
Fred Y Hadaegh

Principal Investigator:

Alejandro M San Martin

Technology Maturity (TRL)

Start: 2
Current: 2
Estimated End: 3



Technology Areas

Primary:

- TX04 Robotic Systems
 - TX04.5 Autonomous Rendezvous and Docking
 - TX04.5.6 Robot Control for Vehicle Capture and Berthing